CLEAN VERSION OF THE SPECIFICATION

DOOR LATCH MECHANISM

[1] This application is a divisional patent application claiming priority to U.S. Nonprovisional Patent Application Serial No. 10/080,365, filed on February 21, 2003, which claims priority to United Kingdom (GB) Patent Application Number 0105120.0 filed on 2 March 2001.

BACKGROUND OF THE INVENTION

[2] The present invention relates to a mechanism for a vehicle door latch.

[3] Known vehicle door latches are lockable using a "free wheeling" principle. Thus, with the door unlocked, lifting of an outside door handle causes the door latch to open. Conversely, with the door locked, lifting of the outside door handle is still possible but a transmission path between the outside door handle and components of the door latch that retains the door in the closed position is broken. Essentially, a break is created in the transmission path. The components on the door handle side of the break are caused to move with the door handle while the components on the other side of the break do not move. A problem with this type of locking is that a space has to be provided for the components on the handle side of the break to move when the handle is lifted.

[4] In an effort to solve this problem, door locks have been developed that have levers positioned adjacent to each other, which can be coupled and uncoupled to provide for selective functioning of the door lock. However, these levers may become undesirably coupled to each other as a result of dirt, dust ingress or rusting of the levers. This undesired coupling presents safety issues because the latch mechanism can be in an apparently uncoupled state when, in fact, actuation of an input lever will cause operation of an output lever and unlocking of the door. Indeed, when the mechanism is used as part of a child safety mechanism on a vehicle to prevent a child from inadvertently opening the door, this coupling is particularly undesirable.

SUMMARY OF THE INVENTION

[5] An inventive latch mechanism has an input member and an output member. The latch mechanism has a first condition at which the input and output member are coupled such that movement of the input member from its first position to its second position causes movement of the output member from its first position to its second position. The latch mechanism also has a second condition at which the input member is not coupled to the output member. The latch mechanism further has a blocking member, which, with the mechanism in its second condition, further prevents one of the input or output members from moving to its respective second position.

BRIEF DESCRIPTION OF THE DRAWINGS

[6] The invention will now be described, by way of example only, with reference to the accompanying drawings in which:

[7] Figures 1A to 1D show a first embodiment of the present invention in various positions.

[8] Figures 2A to 2D show a second embodiment of the present invention in various positions;

[9] Figure 3 shows an isometric exploded view of figure 2A; and

[10] Figures 4A to 4D and 5A and 5D show isometric views of figure 2A to 2D respectively.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[11] With reference to figures 1A to 1D, there is shown latch mechanism 10 mounted on a chassis 12 (only shown in figure 1A). Latch mechanism 10 includes an input member in the form of an input lever 20, an output member in the form of a pin 30, a clutch in the form of a link 40 and a blocking member 50.

[12] Input member 20 is pivotally mounted at input pivot 21 to the chassis 12. Link 40 is pivotally mounted at pivot 41 to end 20B of input lever 20. Blocking member 50 is fixed in a stationary position on chassis 12.

[13] Pin 30 is movable between the positions as shown in figure 1A and figure 1C. Latch mechanism 10 typically forms part of a vehicle door latch arrangement. An inside door handle and outside door handle are connected by a transmission path to end 20A of lever 20. Pin 30 is connected to a pawl, which is capable of retaining a

latch bolt (e.g. a rotating claw) in a closed position. The claw in turn can releasably retain a latch striker in order to retain an associated door in a closed position. Movement of the pin 30 from the position shown in figure 1A to the position shown in figure 1C causes the pawl to disengage the claw and allow the door to open. Thus, with latch mechanism 10 in the position as shown in figure 1A the door is in an unlocked condition. Operation of an inside or outside door handle will cause end 20A of lever 20 to lift (i.e. lever 20 will rotate in an anticlockwise direction) causing end 20B to lower. This movement of end 20B results in abutment 42 contacting and then moving pin 30 to the position shown in figure 1C. It should be noted that in figure 1A and 1C pivot 41, abutment 42 and pin 30 are all aligned.

[14] The mechanism can be put into a locked condition as shown in figure 1B by rotating the link 40 so that it aligns with blocking member 50 and no longer aligns with pin 30. Thus, when an attempt is made to lift the outside door handle abutment 42 moves into contact with blocking member 50, and the outside door handle cannot be fully lifted. The door therefore remains fully closed.

[15] Thieves tend to apply excessive force to outside door handles in the expectation of causing components of the door latch to fail in an attempt to gain entry to the vehicle. However, the present invention mitigates this problem. In the event that blocking member 50 fails (e.g., it breaks off chassis 12), abutment 42 will bypass pin 30. Thus, the door still remains closed.

[16] Under normal circumstances, abutment 42 does not enter the space occupied by blocking member 50. Consequently, this space is available for other components of the latch, enabling a more compact latch design. Preferably, blocking member 50 is not solely dedicated to acting just as a blocking member, but fulfills another function within the latch to further save space.

[17] With reference to figures 2A to 5C, there is shown a further embodiment of the invention. Latch mechanism 110 has components that fulfill substantially the same function as those in latch mechanism 10.

[18] Input lever 120 includes a hole 122, which mounts on input pivot pin 121, which, in turn, is mounted on chassis 112. Input lever 120 includes an L shaped hole 123 and a further hole 124 for connection to an inside door handle 200 or outside door handle 202.

[19] In this case, the output member is in the form of output lever 130 having a pivot hole 131, which is mounted on pin 121. Thus, it can be seen that input lever

120 and output lever 130 lie adjacent to one another and pivot about the same axis. Lever 130 includes a slot 132, which in the position shown in Figure 2A, substantially aligns with leg 123A of L shaped hole 123. Output lever 130 further includes abutment 133 and arm 134.

[20] Blocking member 150 is in the form of a link being pivotally mounted on chassis 112 at pivot 152 and having abutment 153. Adjacent abutment 153, there is a hole 154 in which is mounted pin 161 of link 160. Link 160 includes a clutch at end 160A in the form of a pin 140. Pin 140 engages in L shaped hole 123 of the input lever and also in slot 132 of the output lever.

[21] Pawl arm 170 is connected at end 170A to a pawl (not shown), which releasably retains a latch bolt (e.g. a rotating claw) to secure the door. Movement of the pawl arm 170 from the position shown in figure 4A to the position shown in figure 4C causes the pawl to rotate and allow the door to open.

[22] Operation of the mechanism is as follows.

[23] With the mechanism in the position as shown in figures 2A, 3 and 4A, pin 140 is located at end 132A of slot 132 and hence at end 125 of L shaped hole 123. As such, the input and output levers are coupled together for rotation. Further, as seen from Figure 2A, abutment 133 of output lever 130 is not aligned with abutment 153 of blocking member (i.e., abutment 133, abutment 153 and pivot 152 are not aligned). Thus, operation of an inside or outside door handle causes hole 124 to move in the direction of arrow A of Figure 2A to the position as shown in Figure 2C which results in arm 134 rotating pawl arm 170 and thus opening the door. It should be noted that abutment 133 has bypassed abutment 153 as shown in Figure 2C.

[24] With the input and output levers in the position shown in Figure 2A, block member 150 can be rotated to the position as shown in Figure 2B. This has two effects, namely:

a) Abutment 153 aligns with abutment 133 (i.e. abutments 153, 133 and pivot 152 are aligned) to prevent movement of output lever 130; and

b) Pin 140 is moved (by link 160) to end 132B of slot 132 and hence to the confluence of arms 123A and 123B of L shaped hole 123, i.e., to position 126 (see Figure 3).

[25] In the event that an inside or outside door handle is operated, movement of input lever 120 causes arcuate arm 123B of L shaped hole 123 to move past pin 140, which remains stationary. Compare figures 2B and 2D. Accordingly, if the input and

outside levers corrode or otherwise stick together, then the door is still prevented from opening by engagement between abutment 133 and 153. Under these circumstances, it is not possible to move the associated door handle and this acts as an indicator that the mechanism is malfunctioning. Such an indicator is useful since a malfunction can be determined simply by attempting to operate the door handles. No internal examination of the door is required.

[26] The mechanism can be used in the transmission path between an outside door handle and a latch bolt (i.e., it can be used to lock the door).

[27] Alternatively, the mechanism can be used between both the inside and outside door handles and the latch bolt, i.e., it can be used to superlock (or deadlock) the door.

[28] Alternatively, it can be used between an inside door and a latch bolt, especially on a rear door of a vehicle, i.e. to provide a child safety function of the door latch.